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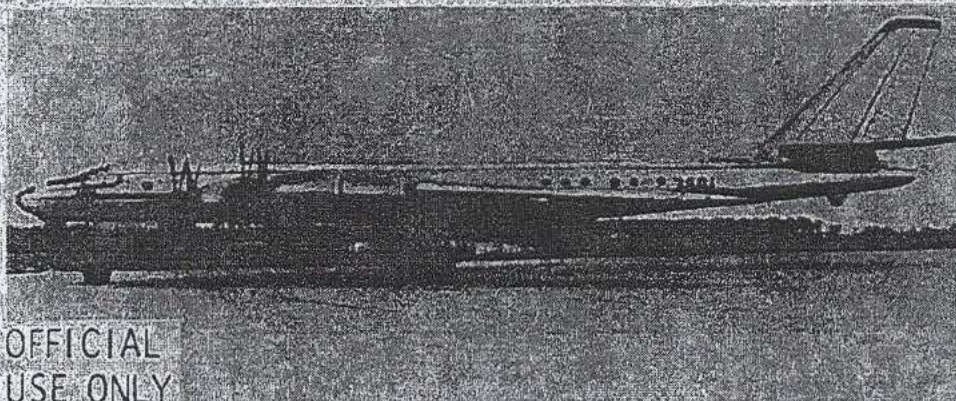
NORTH AMERICAN AIR DEFENSE COMMAND

Weekly Intelligence Review (U)

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NORAD

Weekly
Intelligence
Review

Issue No. 15/64, 10 April 1964

The WIR in Brief

Portion identified
as non-responsive
to the appeal

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Space

NEAR-SPACE COMMUNICATIONS FACILITY BEING BUILT AT ASTROPHYSICAL SITE

Large dish, 2 "double quads" and 2 arrays of
helical antennas noted.

TASS ACCOUNTS OF 'POLYOT' MANEUVERING PROBABLY EXAGGERATION OF VERY MINOR CHANGES

Vehicle did not maneuver after pickup by Shemya
radar, could have maneuvered very little before
then.

SOVIET EARTH SATELLITES LISTED: OVER-ALL SATELLITE SITUATION REPORTED

As of 6 April.

"ZOND 1" PROBABLY A VENUS PROBE ATTEMPT

Soviets cautious about announcing it as a probe in
view of 12 apparent previous failures.

'COSMOS 28' PROBABLY WILL BE DE-ORBITED

No basis available, however, for predicting date
of de-orbit.

Portion identified
as non-responsive
to the appeal

COVER: A Soviet transport known variously as the
TU-114D and TU-116. No ABC nickname
has been assigned this aircraft, only a
handful of which are known to exist. Like
the CLEAT TU-114, it was developed from
the BEAR TU-95 bomber. However, the
fuselage of the TU-114D is slir, and appears
to be similar to the BEAR fuselage, while
the CLEAT's is thicker (see last week's WIR
cover) and was designed specifically for
transport use. (This caption is SECRET; the
photos for OFFICIAL USE ONLY.)

NOTE: Pages 28, 29, 32, 33, 35, and 37 of this
issue are blank.

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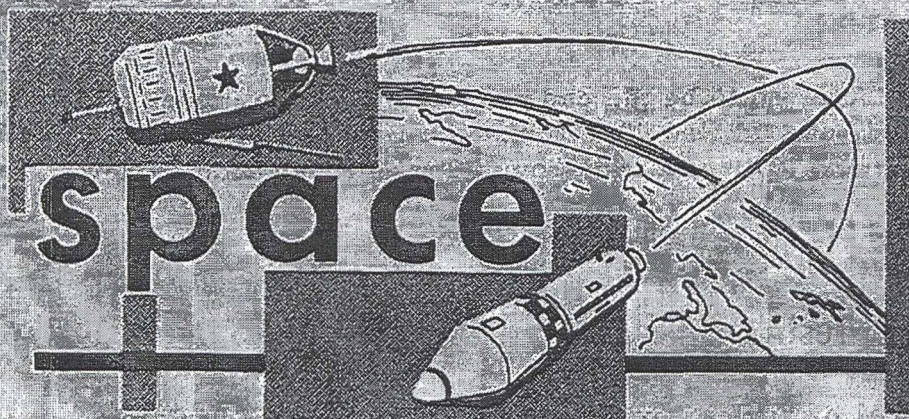
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significant
intelligence
on space
developments
and trends

Near-Space Communications Facility Being Built at Astrophysical Site

Several space-related antenna arrays and a dish antenna are being installed at an astrophysical site near Simferopol (roughly 45°N., 34°E.), judging by photography. A compound surrounded by a stone or block wall encloses a partially completed reflector which would appear to be rather large (maybe 60 feet or more in diameter) as well as two "double quad" antennas (possibly helical) and two arrays of helical antennas which may be trainable.

The dish antenna appears to be large, although there is no nearby object upon which a definitive comparison can be based. One section of it is missing, suggesting that it is not completed yet.

The two large helical arrays appear to be composed of 5 rows of 5 helices each. The method of construction suggests that these arrays can be tilted, and possibly rotated, to some extent. These arrays would probably operate at VHF frequencies with a gain of about 22 db over a circularly polarized isotropic antenna. Beam width of the array is believed to be about 1/4 degrees.

The two "double quad" antennas do not resemble any antennas previously observed. They are probably steerable.

The presence of these antennas indicates that this site is not only an astrophysical site but that it also serves as an important space-vehicle-data collection point and possibly an important ground-space communications facility. The absence of antennas of exceptionally high gain in the vicinity makes it likely that this site is intended for communications with vehicles in near space rather than with those in deep space.

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TASS Accounts of 'Polyot' Maneuvering Probably Exaggeration of Very Minor Changes

TASS reports of last November and early this year that the Soviet space vehicle Polyot 1 had paved the way for advanced space operations by executing

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drastic inflight changes in altitude and orbital plane are believed to be exaggerated accounts of third-stage engine restart and/or a possible minor cross-vector application of thrust. Polyot I was launched from Tyuratam on 1 November 1963.

Data from SPADATS indicate that the highly touted Polyot I made no changes in orbital altitude or plane after it was picked up by Shemya radar, less than 18 minutes after launch. Any changes in orbital parameters that did take place must have occurred before Shemya's pick-up and probably during third-stage powered flight. The altitude of orbit could have been increased simply by third-stage restart, a minor feat. Small changes in orbital plane could have been made by prolonging third-stage burning time and changing the orientation of the thrust vector. Such changes would have been modest, however. While they might find some application in a rendezvous operation, they would be of limited value for military satellite interception.

The US has gone much farther in this area than the USSR. The plane of orbit of one US satellite was changed from 28 degrees to one of 18 degrees during the injection phase, and in other cases highly elliptical orbits were changed to circular orbits.

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Soviet Earth Satellites Listed; Over-all Satellite Situation Reported

Soviet space vehicles still orbiting the Earth or the Sun as of 6 April 1964 are listed on page 34, along with certain of their flight parameters.

The over-all space-vehicle situation as of 6 April 1964 was as follows:

	<u>US</u>	<u>UK</u>	<u>Can</u>	<u>USSR</u>	<u>Total</u>
Payloads in Earth orbit	85	2	1	8	96
Payloads in Sun orbit	5			4	9
Pieces of debris in Earth orbit	308		2	14	324
Pieces of debris in Sun orbit	4				4
Payloads resting on Moon	2			1	3
Total objects in space	404	2	3	27	436
Objects decayed or de-orbited	181			167	348

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'Zond 1' Probably a Venus Probe Attempt

The Soviets on 2 April 1964 launched a space probe which they named Zond 1. TASS said that the vehicle's mission is to assist in the development



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of equipment for "distant interplanetary flight." It appears, however, that Zond 1 is actually an attempt to launch a probe toward the planet Venus:

- It was launched at a time close to optimum for a minimum-energy trajectory toward Venus.
- The probe appears to be heading in the general direction of Venus, according to an analysis of TASS announcements.

The Soviets, instead of naming it Venik 2, gave the vehicle the noncommittal name of "Zond" (Russian for "probe" or "sounder") as a cover in case it misses its planetary target. The Soviets have ample reason for caution in their announcements about interplanetary probes, since all 12 previous known or suspected Soviet attempts have failed. They are aware, too, that the US had many anxious moments with its Mariner 2 (the only successful interplanetary probe to date) before it reached the vicinity of Venus in December 1962. (For estimated configuration of Soviet probes, see page 35.)

A midcourse guidance correction by Zond 1 was made at about 21:18 hours, Moscow time, 3 April, according to TASS, when the probe was about 560,000 kilometers (300,000 n.m.) from the Earth. The TASS announcement said that the probe was speeded up but still did not specify Zond 1's destination.

The probe's position at 1800 hours, Moscow time, 4 April, was expected to be about 837,000 kilometers (450,000 n.m.) from the Earth, with a right ascension of 5 hours, 56 minutes, and an inclination to the ecliptic of 4 degrees, 22 minutes.

Zond 1 was launched from the Tyuratam Missile Test Range at about 0243Z, 2 April. As has been the case with all previous Soviet interplanetary probe attempts, the vehicle was launched into a low, highly circular parking orbit and then injected into a transfer trajectory. Signals intercepted from Zond 1 during its parking orbit were compatible with previous Soviet interplanetary probes.

The Soviets have announced that the probe is transmitting on a frequency of 922.76 mc/s.

No announcements have been made yet as to Zond 1's payload, but it probably carries more instrumentation than did Mariner 2. The Soviets probably intend that this vehicle will approach the vicinity of Venus on or about 22 July 1964 after a flight of 111 days.

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'Cosmos 28' Probably Will be De-Orbited

Cosmos 28, which the Soviets launched from the Tyuratam Missile Test Range at about 0945Z, 4 April 1964, will probably be de-orbited, as has been



the case with all Cosmos-series vehicles launched to date from Tyuratam. (None of the Cosmoses launched from Kapustin Yar have been de-orbited; all have experienced orbital decay or are still in orbit.)

The date that the Soviets will de-orbit Cosmos 28 (all de-orbits have been executed, so far as is known, on command from the ground) cannot be predicted. De-orbit has been executed after as few as 47 revolutions and after as many as 158. There is no consistent pattern to the number of revolutions completed before de-orbit, except that the general numerical trend is upward, and vehicles which transmit video signals tend to be de-orbited sooner than those which do not transmit such signals. Orbital parameters do not seem to be a guiding influence, except that de-orbit has always been executed before the expected date of natural decay.

A comparison of Cosmos 28's orbital parameters as developed by SPADATS and as announced by TASS follows:

	<u>SPADATS</u>	<u>TASS</u>
Inclination to Equator	64.65 degrees	65 degrees
Orbital period	90.37 minutes	90.38 minutes
Apogee	207.7 n.m.	213 n.m.
Perigee	111.9 n.m.	113 n.m.

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TASS, the Soviet news agency, has not announced any specific mission for Cosmos 28 except to refer to the general mission of all the Cosmos vehicles which TASS announced in March 1962 after the launch of Cosmos 1. The mission of these vehicles, it was said, is to collect data on near-Earth space and on the Earth's cloud cover and to transmit this data to Earth.

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Soviet Vehicles in Earth Orbit as of 6 April 1964

<u>International Designation</u>	<u>Common Name</u>	<u>Launch Date</u>	<u>Inclination to Equator (degrees)</u>	<u>Period (minutes)</u>	<u>Apogee (kilometers)</u>	<u>Perigee</u>
1962-B, Theta 1	Cosmos 11	22 Oct 62	48.93	90.8	407.2	211.5
1963-17A	Cosmos 17	22 May 63	48.98	93.4	625.9	250.1
1963-43A	Polyot 1	1 Nov 63	58.95	102.4	1400.2	344.0
1964-6A	Electron 1	30 Jan 64	60.85	169.3	7117.5	403.7
1964-6B	Electron 2	30 Jan 64	60.46	1356.4	68014.9	408.2
1964-10A	Cosmos 25	27 Feb 64	49.05	92.1	489.4	259.5
1964-13A	Cosmos 26	18 Mar 64	48.98	91.0	375.7	267.8
1964-17A	Cosmos 28	4 Apr 64	64.64	90.37	395.8	211.5

Soviet Vehicles in Heliocentric (Sun) Orbit

<u>International Designation</u>	<u>Common Name</u>	<u>Launch Date</u>	<u>Inclination to ecliptic (degrees)</u>	<u>Period (days)</u>	<u>Aphelion (astronomical units)^a</u>	<u>Perihelion^a</u>
1959 Mu 1	Lunik 1	2 Jan 59	0.01	449.4	1.315	0.9766
1961 Gamma	Venik	12 Feb 61	0.58	300	1.0190	0.7183
1962 Beta Nu 3	Mars 1	1 Nov 62	2.683	519.1	1.604	0.9237
1964-16	Zond 1	2 Apr 64	Data Not Available			

Soviet Vehicles in Barycentric (Earth-Moon) Orbit

1963-8B	Lunik 4	2 Apr 63				
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Soviet Vehicles Resting on Surface of the Moon

1959, Xi 1	Lunik 2	12 Sep 59				
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^aAstronomical unit -- mean distance from Earth to Sun, about 93 million statute miles.

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Configuration of Soviet Interplanetary Probes (Estimated)

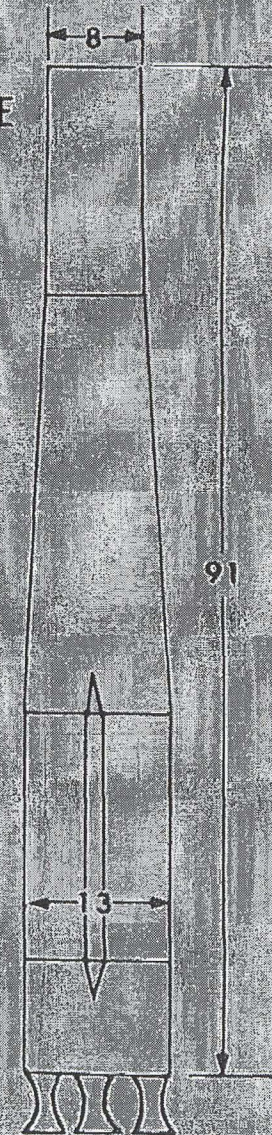
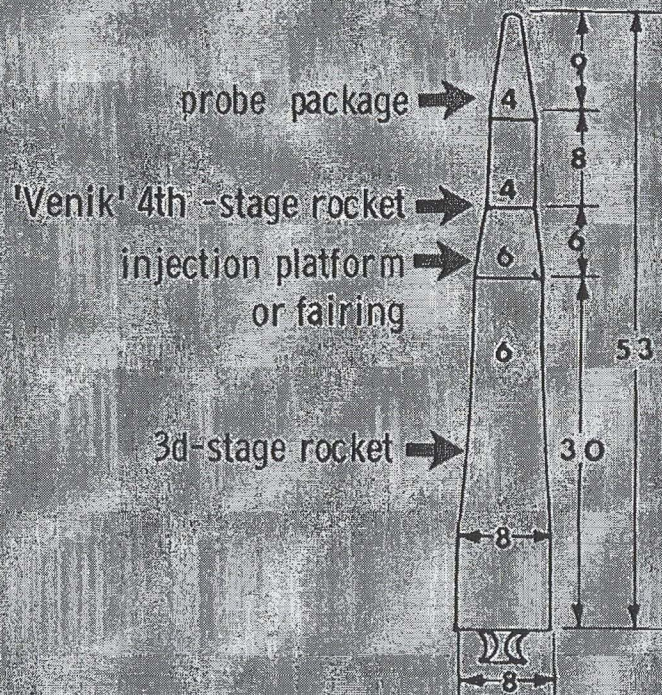


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PROBE & UPPER STAGING

LAUNCH VEHICLE (SS-6 ICBM)



Upper stage dimensions are believed to be accurate to within 15 percent in length and 20 percent in width.

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